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THE AMERICAN
JOURNAL OF PHARMACY

AUGUST, 1917

THE STABILITY OF IODINE OINTMENTS.

By L. E. Warren, Ph.C., B.S.

(Contribution from the American Medical Association Chemical Laboratory.)

In general, the literature on the keeping qualities of iodine ointment, and on the stability of iodine if mixed with ointment bases, is confusing. The recorded evidence is often contradictory. The attention of the writers was brought to this condition by studies of several proprietary preparations, Iodex,[1] Iod-Izd-Oil,[2] Iocamfen,[3] and Iocamfen[3] Ointment.

Iodex was sold under the claim that it is

"... an embodiment of vaporized iodine, in an organic base, reduced and standardized at 5 per cent. by incorporation with a refined petroleum product."

The exact composition of Iodex is a trade secret. Analysis showed that it contains petrolatum-like substances and combined iodine, the latter probably in combination with oleic acid. Tests for free iodine were made in five specimens of Iodex. In one of these no free iodine was present; in the others the merest traces were found.

Two years ago a preparation called "Iod-Izd-Oil" was examined. This was claimed to contain 2 per cent. of free iodine in liquid petrolatum. At the time of the examination the age of the preparation was not known, but it had been obtained just prior to the analysis, and was thought not to be very old. The analysis

[1] *Rep. Lab. A. M. A., 8,* 89 (1915).
[2] *Rep. Lab. A. M. A., 8,* 106 (1915).
[3] *Rep. Lab. A. M. A., 9,* 118 (1916).

showed that it contained but about 0.43 per cent. of iodine, all of which was in a free state. The fact that all of the iodine present was in the free state appeared to indicate that iodine is relatively stable in liquid petrolatum solutions.

Iocamfen is a liquid composed of iodine, camphor and phenol. It was claimed to contain 10 per cent. of free iodine. Analysis showed that it contained 9.3 per cent. of total iodine (of which 7.5 per cent. was present in an uncombined state), 66.1 per cent. of camphor and 19.7 per cent. of phenol. After storing for several months a second assay of Iocamfen showed no appreciable loss in iodine content. This would indicate that iodine is relatively stable in presence of phenol and camphor, although immediately after mixing there is some loss of free iodine. The Iocamfen Ointment was supposed to contain 50 per cent. of Iocamfen (equivalent to 5 per cent. of free iodine) in a lard-wax-cacao-butter base. The analysis showed that the ointment contained but 0.4 per cent. of free iodine, the balance being in combination. From the results of the examination, and from corespondence with the manufacturers (Schering and Glatz), it became evident that the only plausible explanation for the loss of free iodine in the preparation of Iocamfen Ointment from Iocamfen lay in the combination of the free iodine with the ingredients of the ointment base. It seems likely that the free iodine originally present in Iocamfen for the most part had gradually gone into combination with the fatty substances after the ointment had been prepared.

The literature was then examined to determine the consensus of opinion concerning the stability of iodine in iodine ointment. In the older literature the belief that iodine ointment is unstable appears to be quite general. Such statements as the following are typical:

> The ointment should be prepared only when wanted for use, for it undergoes change if kept, losing its deep, orange-brown color, and becoming pale upon its surface.[4]
>
> It is better to prepare it only as it is required for use.[5]
>
> This ointment must not be dispensed unless it has recently been prepared.[6]

In 1909 Lythgoe,[7] of the Massachusetts Board of Health laboratory, reported an examination of four samples of iodine ointment.

[4] U. S. Disp., ed. 19, p. 1315.
[5] Am. Disp., ed. 2, p. 2022.
[6] U. S. Pharmacopeia, IX, p. 481.
[7] *Rep. Mass. Bd. Health, 41,* 477 (1909).

Three were found to be pure, the fourth was low in iodine. Experiments showed that iodine ointment deteriorates rapidly; consequently, no further collections of samples were made.

In 1912 Pullen[8] reported that he had prepared two specimens of iodine ointment according to the British Pharmacopeia, one being from new lard and the other from a specimen of lard at least two years old. Assays for free iodine were carried out immediately after the preparations were made, and at intervals afterward up to four months. The following values were found:

	Sample I. Ointment from new lard, Per Cent.	Sample II. Ointment from old lard, Per Cent.
Iodine introduced	4.0	4.0
Iodine found immediately after making	3.95	3.38
Iodine found after twenty-four hours	3.30	3.15
Iodine found on the third day	3.18	2.62
Iodine found on the seventh day	3.15	2.46
Iodine found on the fourteenth day	3.00	2.45
Iodine found after one month	3.00	2.39
Iodine found after two months	2.90	2.31
Iodine found after four months	2.92	2.26

Pullen found that the loss in free iodine could be accounted for by the iodine which had gone into combination with the fats of the ointment base.

Pullen also found that if the potassium iodide and glycerin were omitted in the preparation of the ointment, the loss in free iodine was very rapid, the preparation containing practically no free iodine (only $\frac{1}{20}$) after a few hours. He concludes that the use of potassium iodide and glycerin is necessary for the preservation of the ointment. He obtained specimens of iodine ointment in drug stores, and assayed them for free iodine. It is to be presumed that the ages of the several specimens were not known. The results are found in the following table:

Specimen No. 1	2.74 per cent.
Specimen No. 2	2.85 per cent.
Specimen No. 3	2.62 per cent.
Specimen No. 4	2.48 per cent.
Specimen No. 5	2.53 per cent.
Specimen No. 6	2.79 per cent.

[8] *Pharm. Jour.*, *89*, 610 (1912).

Fried[9] prepared iodine ointment according to the U. S. P. VIII formula, and assayed it at intervals. His results are tabulated herewith:

	Per cent
Iodine introduced	4.00
Iodine found immediately after making	3.89
Iodine found one hour after making	3.51
Iodine found one day after making	3.48
Iodine found five days after making	3.06
Iodine found ten days after making	2.84
Iodine found thirty days after making	2.81
Iodine found ninety days after making	2.81
Iodine found eight months after making	2.81

Iodine ointment has been official in the U. S. Pharmacopeia since 1870. Briefly, the method now used for making the preparation is as follows:

Four Gm. of iodine, 4 Gm. of potassium iodide and 12 Gm. of glycerin are weighed into a tared mortar and the mixture triturated until the iodine and potassium iodide are dissolved and a dark, reddish-brown, syrupy liquid is produced. Eighty Gm. of benzoinated lard are then added in small portions and with trituration after each addition. The mass is then triturated until of uniform consistence.*

* The time required to complete the process after the initial portion of lard had been added should be about twenty minutes.

Iodine ointment is officialized also in several foreign pharmacopeias, although the iodine strength of the several preparations is not uniform. The formula in the British Pharmacopeia is exactly like that in the U. S. Pharmacopeia except that pure lard is directed to be used instead of benzoinated lard. Some of the foreign pharmacopeias also specify that the preparation must be freshly prepared when wanted. In the earlier editions the U. S. Pharmacopeia directed the ointment to be prepared by using water as the solvent for the potassium iodide. In the U. S. Pharmacopeia VIII the formula was changed so as to employ glycerin, and that solvent is now official. Water is still prescribed as the potassium iodide solvent by the Pharmacopeias of the Netherlands and of France.

From the examination of the literature it seems probable that iodine ointments which contain petrolatum products only as the ointment bases are apt to be relatively stable, so far as the content of free iodine is concerned. On the other hand, ointments the bases of

[9] *Pharm. Jour.*, *89*, 610 (1912).

which contain fats of the unsaturated fatty acid series, such as oleic acid, do not satisfactorily preserve the iodine in the free state. In the latter class it seems likely that the iodine enters into combination with the unsaturated fatty acids. Accordingly, on theoretical grounds, an ointment base composed of pure stearin (if such substance were available) but softened by an admixture of liquid petrolatum would preserve the iodine satisfactorily. Cocoanut oil (iodine No. 8) ought to be suitable also if mixed with hard paraffin.

Since the literature was not sufficiently concordant to warrant positive conclusions concerning the stability of ointments containing free iodine, it seemed worth while to conduct experiments with preparations of known origin. Accordingly a number of preparations containing free iodine were made under varying conditions and each was assayed for its free iodine content immediately after its manufacture and from time to time later.

Leaf lard of the best quality obtainable was purchased from a butcher. This was rendered in an open dish on the steam bath. The preparation was of a fine color, and uniform consistence and had a faint but not unpleasant odor. Two specimens of lard were furnished by the research department of Armour and Company. An effort was made to procure specimens of lard having iodine absorption numbers as far apart as possible, *i. e.*, one with a low and the other with a high iodine value. This was done in order to determine whether the keeping qualities of the ointments prepared from the two would be alike.

One of the specimens (*a*) was described as

"Natural lard; iodine value, 57.1. Leaf lard used exclusively for butterine and benzoinated lard."

The other specimen was described as

"Prime steam lard. Good, commercial grade of lard for general use; iodine value, 69.0."

The iodine absorption numbers of the three specimens were determined by the U. S. P. process, and were found to be as follows:

Laboratory rendered specimen	57.1
Armour specimen (*a*)	57.65
Armour specimen (*b*)	67.55

Each specimen was benzoinated according to the process described in the U. S. P. IX and 100 Gm. of iodine ointment were pre-

pared from each according to the U. S. P. process. Another specimen was made from benzoinated lard and iodine only* without the addition of either glycerin or potassium iodide. This was made to contain 4 per cent. of iodine.

Immediately after preparation each of these iodine ointments was assayed for free iodine, and each was reassayed at intervals later. The method for the determination of iodine in the ointment was that employed in this laboratory for the determination of iodine in Iocamfen Ointment.[10] It is essentially the same as was employed by Pullen for the determination of uncombined iodine in iodine ointment.[11] As carried out in this laboratory for iodine ointment it is as follows:

From 5 to 8 Gm. of the ointment were weighed in a small porcelain capsule, the capsule and contents placed in a 16 oz. salt mouth bottle together with 20 Cc. of chloroform, 10 Cc. of potassium iodide solution and 40 Cc. of water. Tenth-normal sodium thiosulphate was slowly added with agitation until the pink color of the chloroform layer had nearly disappeared. A little soluble starch was then added and the titration continued until a blue color in the aqueous layer could no longer be obtained by repeated shaking.

The findings for the several assays are tabulated herewith:

TABLE I.

Iodine Content of Iodine Ointments.

Age at time of assay.	U. S. P. ointment from laboratory rendered lard (% I).	U. S. P. ointment from commercial lard Grade I (% I).	U. S. P. ointment from commercial lard Grade II (% I).	Ointment from lard and iodine only (laboratory rendered lard) (% I).
Freshly made	3.32	3.26	3.30	0.32
After 3 days	3.25	——	——	0.23
After 7 days	2.99	3.17	3.15	——
After 3 weeks	3.01	3.19	3.07	——
After 7 weeks	3.12*	3.10	3.02	——
After 3 months	2.98	2.88	2.88	——

* This slight rise in iodine content followed by a fall could not be accounted for. The specimen was believed to have been very thoroughly mixed at the time of manufacture.

That the fatty constituents of the ointment contained iodine after the preparation had been made for some time was demonstrated. Some of the material was examined as follows:

* In order to facilitate the incorporation of the iodine with the fatty base the iodine was first powdered by trituration with alcohol and drying the powder in the air.

[10] *Rep. Lab. A. M. A.*, 9, 118 (1916).

[11] *Pharm. Jour.*, 89, 610 (1912).

A portion of the ointment which had been made for nearly three months was shaken in a separator with chloroform and a dilute mixture of potassium iodide and sodium thiosulphate solutions. After all of the free iodine had been removed the chloroformic solution of the fats was washed several times with a very dilute solution of sodium thiosulphate. The chloroformic solution was filtered, evaporated and the residue dried over sulphuric acid.*

The separated fat was then tested for iodine by Kendall's method.[12] It was found to contain iodine in considerable amounts, but quantitative determinations were not made.

The Pharmacopeia of the Netherlands directs that iodine ointment shall contain 3 per cent. of potassium iodide and 2 per cent. of iodine instead of equal proportions (4 per cent. of each) as prescribed by the U. S. Pharmacopeia. Likewise the French Pharmacopeia directs that 10 per cent. of potassium iodide and only 2 per cent. of iodine shall be used. Both of these pharmacopeias use water instead of glycerin as the solvent. Loose combinations of iodine and potassium iodide, such as is represented by the compound having the formula KI_3, have been described. The quantity of potassium iodide prescribed by the U. S. Pharmacopeia for the preparation of iodine ointment is not sufficient to form such a compound as KI_3 with all of the iodine directed to be used. Since some of the pharmacopeias use larger proportions of potassium iodide (more than sufficient to form the compound, KI_3), it seemed worth while to determine whether an ointment containing a greater proportion of potassium iodide than that required by the U. S. Pharmacopeia would be more stable than the official article. Accordingly a specimen was prepared to contain 4 per cent. of iodine, 8 per cent.

* The resultant fatty residue was of a brownish-green color. It no longer had either the taste, color or odor of lard. It was noted that the fats, after removal by this method from the freshly prepared ointment, were nearly white. As the ointment aged the fat became successively darker in color.

[12] The method depends upon the conversion of all of the iodine compounds into iodate by fusion with sodium hydroxide and oxidation with potassium nitrate. The melt is dissolved in water, a little sodium bisulphite added, the solution cooled and neutralized with phosphoric acid, using methyl orange as indicator. An excess of bromine water is added, and the mixture boiled to expel carbon dioxide and bromine. A little sodium salicylate is added, the solution cooled, an excess of potassium iodide added, and the liberated iodine titrated with tenth-normal sodium thiosulphate in the usual way. One sixth of the iodine found is obtained from the material assayed, the balance being furnished by the potassium iodide added. *Jour. Biochem.*, *19*, 251 (1914).

of potassium iodide (twice the U. S. P. requirement), 12 per cent. of glycerin and 76 per cent. of lard. This was assayed for its free iodine content immediately after preparation, and found to contain 3.68 per cent. Nine days later it contained 3.70 per cent. Another specimen of the same iodine strength prepared from grade No. 2 of commercial lard assayed 3.69 per cent. at the initial assay, and seven days later 3.40 per cent. From these experiments it seems likely that the free iodine content of the U. S. Pharmacopeia iodine ointment could be raised somewhat by increasing the proportion of potassium iodide.

The results of these studies confirm the findings of Pullen and of Fried in all essential particulars. It appears that during the process of manufacture of iodine ointment about 20 per cent. of the free iodine goes into combination with the fatty constituents of the ointment. On standing for a month approximately an additional 5 per cent. goes into combination, after which there is practically no loss in free iodine content. In other words iodine ointment which is a month old is a relatively stable preparation. It appears to make no noticeable difference upon the rate and amount of iodine absorption whether the lard from which the ointment is made has a high or a low iodine absorption value. The composition of iodine ointment, which has been made sufficiently long to have reached equilibrium, is approximately as follows:

Free iodine	3 per cent.
Iodine combined with fat	1 per cent.
Potassium iodide	4 per cent.
Benzoinated lard (containing iodine)	80 per cent.

The U. S. Pharmacopeia requirement that iodine ointment shall be freshly prepared when wanted appears to be unnecessary. Probably most pharmaceutical manufacturers are aware of this, for many of them include the preparation in their trade lists. The presence of an iodide appears to be necessary, to prevent practically all of the iodine from entering into combination with the fat.*

* In order to determine whether the iodine which is in combination with fat is absorbed through the skin, a few experiments were carried out. The dark-colored iodine-containing fat (obtained from the ointment and washed free from potassium iodide by the method described above) was rubbed thoroughly into the skin of the forearm. It was allowed to remain for four hours, after which the limb was scoured with soap suds. Beginning at the time of the application the urine was collected for forty-eight hours. This

DETERMINATION OF ASPIRIN AND SODIUM SALICYLATE IN POWDERS.

By Reginald Miller, Chemical Laboratory, New York City Dept. of Health.

Among samples received at the Laboratory were those consisting of aspirin and sodium salicylate. The following method has been found satisfactory, and its publication may assist others who are doing similar work.

Aspirin.—Weigh the collective contents of several packages, mix thoroughly. (If sample is not a fine powder, grind it in a mortar until it is.) Take a weighed portion corresponding to that of one package, transfer to a small beaker, add an equal volume of clean sand, and 8 or 10 mils of ethyl ether, stir the mass with a glass rod, allow to settle, decant through a small dry filter paper, repeat the extraction about ten times, collect the filtrates in a weighed glass dish, evaporate to dryness. Weigh.[1]

Residue should respond to the following tests:

Conc. nitric acid—yellow, gradually deeper.

Froede's reagent—immediate purple coloration.

Formaldehyde sulphuric acid—faint red color after one or two minutes.

Selenious sulphuric acid—No change in color.

Conc. sodium hydroxide—No change in color.

Solium Salicylate.—To the beaker containing the sand and the portion insoluble in ether, transfer the filter paper (that was used

was evaporated to small bulk and the residue tested for iodine by Kendall's method. Small amounts of iodine were found. These findings were taken to indicate that the iodine-containing fat is absorbed to some extent by the skin. It is generally believed that potassium iodide is not absorbed by the unbroken skin. Therefore it seems reasonable to suppose that the principal iodine effects obtainable from iodine ointment are those due to the free iodine contained in the preparation, supplemented to a slight extent by the iodine which is contained in the fatty ointment base. *Jour. Biochem., 19,* 251 (1914).

[1] The aspirin may be checked by taking a weighed portion of the original sample (about .100 G.), dissolve it in 95 per cent. alcohol (neutral) and titrate it with $\frac{N}{10}$ sodium hydroxide, using phenolphthalein as the indicator. One mil of $\frac{N}{10}$ sodium hydroxide = .0180 G. of aspirin. If substances are present which interfere with the determination directly on the powder, take a weighed portion of the residue (about .050 G.) and titrate with the $\frac{N}{10}$ alkali.

in aspirin determination) add dilute sulphuric acid (about 10 per cent.) until the mass is moistened throughout,[2] repeatedly extract with ethyl ether, making about twelve extractions, filter through a dry filter paper and collect filtrates in a weighed glass dish. Evaporate to dryness, weigh the residue, which is salicylic acid.[3]

Ferric chloride added to an aqueous solution, gives a bluish violet coloration.

A small portion of salicylic acid heated with several drops of methyl alcohol and sulphuric acid (conc.) will give the characteristic wintergreen odor.

Sodium salicylate is computed from the salicylic acid by multiplying by the factor 1.1651, which gives U. S. P. sodium salicylate of 99.5 per cent. purity, or by the factor 1.1593, which gives C. P. sodium salicylate.

REASONS FOR SOME OF THE CHANGES IN THE FORMULAS OF GALENICALS MADE IN THE NINTH REVISION OF THE UNITED STATES PHARMACOPEIA.[1]

By George M. Beringer, Ph.M.

At the meeting of the Philadelphia Branch of the American Pharmaceutical Association held in November, 1916, the writer presented a paper under the above title. As the program for that meeting was a symposium on the Pharmacopeia and there was assigned to me the title "Extracts, Fluidextracts and Tinctures," my communication was primarily restricted to the changes made in these classes of official galenicals. The favorable comments elicited by the publication of that paper appear to indicate that a continuation of the subject to the other galenicals of the pharmacopeia would be an appropiate topic for presentation at this meeting.

The reasons for some of the changes made in the revision of the pharmacopeia are so easily understood as to be classified as "self-

[2] The sulphuric acid must be in excess, in order to completely decompose the sodium salicylate.

[3] The salicylic acid may be checked by titration, using $\frac{N}{10}$ barium hydroxide and phenolphthalein as the indicator. One mil of $\frac{N}{10}$ barium hydroxide = .013805 G. pure salicylic acid.

[1] Read at the meeting of the New Jersey Pharmaceutical Association, Hotel Breslin, Lake Hopatcong, June 14, 1917.

apparent," but for other changes it may be difficult to assign a tangible explanation.

The decision whether an article or formula shall be admitted to, retained in, or deleted from the official list of titles is presumed to be based upon the medical practice of the time and the general or extended use of such medicament. The late Professor C. S. N. Hallberg assiduously gathered statistics from all over the United States to determine the facts regarding the use of hundreds of drugs and preparations with the expectation that the statistics so gathered would be available and accepted by the Committee of Revision as the basis for deciding the admission, retention or dismissal of articles on the official list. The decisions of the committee seem to indicate that these data were not given the consideration it had been expected they would receive and that the decisions on such matters were largely based on personal practice and preferences. Consequently, it is hard to reconcile as consistent the changes made by the additions and deletions. It is, for example, difficult to explain why acidum camphoricum was dismissed and acidum phenylcinchonicum has been admitted, and why apocynum and fluidextract of apocynum were deleted and aspidospermum and fluidextract of aspidospermum have been introduced.

On the basis of American medical practice and use, it is even more difficult to explain the expulsion from the official list of such popular formulas as cataplasm of kaolin, antiseptic solution, Goulard's cerate, compound resin cerate, compound acetanilid powder, mixture of rhubarb and soda, compound spirit of ether, compound syrup of hypophosphites, and ointment of red mercuric oxide. How fortunate it is that we have in the National Formulary a second legal authority and that it has incorporated these formulas and so retained authoritative legal standards for these. It may be that the knowledge that the National Formulary would probably adopt these dismissed formulas may have influenced the decisions of the pharmacopeia revision committee. Whatever may have been the cause, these actions demonstrate the necessity for the two legal standards and how fortunate it was that the National Formulary was systematically revised. The increased importance thus accorded to the National Formulary now makes imperative that it be permanently maintained on a high scientific basis.

The improvements in the directions for the preparing and the proper storing of galenicals in order to insure permanency and

efficiency of the products is in evidence throughout the U. S. P. IX. As examples, chloroform water, creosote water, orange flower water and rose water are directed to be prepared with recently boiled distilled water.

In aqua hamamelidis, the impractical and inaccurate formula of the U. S. P. VIII has been omitted. The production of this preparation can not be undertaken by the pharmacist and it can only be carried on as a commercial operation in favorable localities. The Pharmacopeia has rightly eliminated the process and standardized the product so far as possible and supplied appropriate tests for adulterants.

The readiness with which the public accepts and the drug trade adapts itself to the legal pronouncements of the pharmacopeia has been shown by the universal acceptance of the official standard for poison tablets of corrosive sublimate. The prompt disappearance from the drug stores of the formerly extensively used white disk shape of sublimate tablets has minimized the danger of accidental poisoning from this source, which was for a time so prolific of fatalities.

The number of cerates has been reduced from six to three and the formulas of two of these retained are notably improved. The U. S. P. VIII directed 20 per cent. of white petrolatum to be used in the formula for cerate. Petrolatum in this mixture of wax and lard did not prove to be satisfactory or yield a uniform smooth product; hence, the return in the formula to white wax and benzoinated lard was decided upon.

In the U. S. P. VIII formula for cantharides cerate, the powdered cantharides was directed to be macerated "in a warm place for forty-eight hours with the liquid petrolatum." Liquid petrolatum is not a good solvent for cantharidin and no attempt was made by this formula to liberate the combined cantharidin or to obtain the maximum effect from the cantharides used. In the improved formula of the ninth revision glacial acetic acid is directed to liberate the cantharidin and likewise to aid in its solution in the turpentine. The formula is very satisfactory and with good cantharides will yield an efficient epispastic.

In cantharidal collodion, we note another improved formula based upon our knowledge of cantharides and the proper solvents for its constituents. In the U. S. P. VIII formula for this, the cantharides was directed to be exhausted with chloroform and the

extract so obtained mixed with flexible collodion. The resulting product usually gelatinized or precipitated in a short time and became worthless. The extraction with a mixture of acetone and acetic acid now directed yields an active and permanent preparation.

In flexible collodion of the revision, by the use of camphor and castor oil in appropriate proportions a closely adhering stronger and more flexible film is produced than that yielded by the old formula with larger quantities of Canada turpentine and castor oil and does so at considerable saving in cost.

Elixir glycyrrhiza is now the official title instead of elixir adjuvans, the slight increase in the amount of the fluidextract of glycyrrhiza directed only rounding out the proportion of 1 to 7 of elixir.

In modern pharmaceutical practice, emplastra do not play a very important rôle. The preparation of adhesive plaster and belladonna plasters now used can only be attempted on a large scale and with special machinery; hence, formulas for these are omitted.

Lead plaster, instead of being prepared by decomposing soap by lead acetate, as in the U. S. P. VIII is now directed to be made by boiling with water equal weights of lead oxide, olive oil and lard. If ingredients of proper quality be used, the resulting product will no doubt be satisfactory.

In infusion of digitalis, we note a change of doubtful propriety, namely, the omission of alcohol. The argument used in favor of this change was that the alchohol played no part in the extraction of the drug or the therapeutic activity of this preparation and that it gave a false impression as to the stability so that the infusion probably would not be made and used as fresh as it should be. While it must be acknowledged that the alchohol is not necessary for the making of the infusion, it is nevertheless uncertain if it did not serve a useful purpose in the formula. Infusion of digitalis is not administered while freshly made and warm and in large doses, as are many of the common infusions. The physician usually directs a dose of from one to four fluid drachms[2] several times a day and prescribes sufficient for several days. The 10 per cent. of alchohol formerly directed was sufficient to preserve the infusion for this limited period and I am not convinced that it did not like-

[2] It is to be noted that the average dose of the U. S. P. VIII was given as 2 fluid drachms and the U. S. P. IX now states: Average dose 1 fluid drachm.

wise exert some therapeutic action by stimulating the absorption of the digitalis. Complaint has already been made that the infusion made by the new formula, without the alcohol, very soon spoils. Our experience with the other digitalis galenicals proves that the glucosides of this drug are readily hydrolyzed even in a menstruum of diluted alcohol, and to avoid rapid deterioration in the tincture and fluidextract, the Pharmacopeia has increased the alcoholic content of these preparations. Yet on theoretical grounds, not substantiated by either practical experiment or therapeutic testing, the alcohol was stricken from the infusion, one of the most important of diuretic and cardiac remedies.

Ammonia liniment is directed to be made by agitating 1 volume of ammonia water with 3 volumes of sesame oil and this simple procedure yields a perfect preparation. The U. S. P. VIII patriotically endeavored to utilize in this formula an American product, cotton-seed oil, and in order to saponify this added oleic acid and alcohol, thus presenting a wasteful and ridiculous formula.

In mucilage of acacia, the Eight Revision directed the use of 33 per cent. of lime water in order to overcome the natural acidity of acacia. The lime water content at times created incompatibility as, for example, when the mucilage of acacia was directed to be used to suspend calomel. The revision rightly omits the lime water and directs that this mucilage should be frequently made and not dispensed if it has deteriorated.

In oleate of mercury, the use of alcohol in place of water will shorten the time required and diminish the danger of reduction of the mercury.

The change made in the formula for soft soap, cotton seed oil being directed in place of linseed oil, has likewise been directed by economic reasons rather than by scientific. The new formula is defective and the product is deficient in that very necessary property of a soap, namely, detergency.

In the mint spirits, the respective peppermint or spearmint, used for coloring and clarifying, is first washed with water which removes the brown and yellow colorings as well as much extraneous dirt and the resulting spirit is more uniformly of a bright green color.

The acid content of syrup of hydriodic acid was slightly increased so as to make the official syrup not below the strength claimed for some of the proprietary syrups.

In syrup of calcium lactophosphate and in syrup of hypophosphites, the addition of 50 mils of glycerin to the liter adds materially to the stability of these syrups.

In syrup of wild cherry, we note a return to the method of adding the glycerin to the first portion of the menstruum instead of to the percolate. While this procedure may yield a deeper colored syrup that may be richer in tannin, it is doubted if this should be the proper aim and it is questioned whether the hydrocyanic acid content is not actually diminished.

In the ointments, a few changes are noteworthy. Such minor changes as those made in belladonna ointment and in diluted mercurial ointment are readily understood and will cause little comment. In diachylon ointment, white petrolatum is substituted for olive oil, which yielded an ointment of too fluid a consistence. Ointment of phenol is reduced from 3 per cent. phenol to about 2 per cent. and ointment is directed as the base instead of white petrolatum. The changes made in the formula may cause some trouble with customers to whom it may be difficult to explain the difference in the appearance of carbolic ointment.

The elimination of all wines from the Pharmacopeia was probably due to a misunderstanding of the requirement of the Brussels International Protocol. Physicians will continue to prescribe the wines of antimony, colchicum, ipecac, etc., and pharmacists will furnish these as heretofore. In the formula for compound mixture of glycyrrhiza, the substitution of the equivalent amount of tartar emetic dissolved in water for the wine of antimony is directed and this was the only change in the official formulas necessitated by the deletion of the class of wines from the Pharmacopeia.

LEAD IN MEDICINAL ZINC OXIDE.[1]

By Charles H. LaWall.

Zinc oxide has been a medicinal substance of importance for several hundred years. It was official in the first U. S. P. with a method of preparation from the metal, which would give a modern pharmacist something to exercise his professional skill upon, if he

[1] Read at the annual meeting of the New Jersey Pharmaceutical Association, June 14, 1917.

were now, as he was then, dependent entirely upon his own exertions for his supply of many of his chemicals.

For many years the supplies of zinc oxide entering the pharmaceutical trade were of high quality, and while it was necessary occasionally to reject a lot, there was not a great deal of trouble in obtaining supplies which were in full compliance with the U. S. P. in every respect.

This condition has recently changed, and I think I can safely assert that ninety per cent. of the zinc oxide on the market at the present time will not only not answer the U. S. P. test for absence of heavy metals but that in the majority of instances lead is present in an amount ranging from 0.1 per cent. to 0.5 per cent. calculated as metallic lead.

This condition has come about through the well-known fact that few if any pharmacists test their supplies and still fewer pay any attention to such statements of the label as "U. S. P. in all respects except the heavy metal test."

No statement has appeared in recent literature calling attention to this condition, nor do the standards of any of the prominent pharmacopeias of the world make any allowance for such large amounts of this impurity in zinc oxide. The latest editions of the following pharmacopeias were consulted: Austrian, Belgian, British, Danish, French, German, Italian, Japanese, Netherland, Norwegian, Swedish, Swiss, Spanish and our own U. S. P.

In all of these there is a specific test for the absence of lead, the test being made in a slightly acid solution of the oxide with solution of hydrogen sulphide, the requirement being that a white precipitate be produced. The German Pharmacopeia has in addition a specific test for absence of lead with potassium chromate solution in an acid solution of the oxide.

In applying the hydrogen sulphide test, found in all of the Pharmacopeias quoted above, some difficulty is often experienced in observing the darkening due to lead on account of the interference of the light colored zinc sulphide which comes down and obscures the test and frequently makes it necessary to add repeated amounts of hydrogen sulphide and then make the final observations in comparison with a sample to which a known amount of lead has been added.

A very satisfactory method of detecting and estimating the lead which seems to be present occasionally as the sulphate, in part at

least, is to dissolve 5 grammes of the sample of zinc oxide in a slight excess of diluted sulphuric acid, with gentle heat; collect and wash the precipitate with distilled water; then pour through the filter containing the precipitate a concentrated solution of ammonium acetate (about 25 per cent.) freshly made, and to this filtrate which now contains the lead in a soluble form add a slight excess of solution of potassium chromate which will precipitate insoluble lead chromate which may be collected on counterpoised filters, or on a Gooch crucible mat, washed, dried, weighed and calculated as to its percentage. A more expeditious method which gives very good results with the amount of lead usually found at the present time is to simply dissolve 5 or 10 grammes of the sample in an excess of acetic acid and then perform the precipitation with potassium chromate in this solution directly, and collect, wash and weigh the precipitate as before. This latter modification will give low results, however, where part of the lead is present in the form of sulphate, as is often the case, as the sulphate will remain behind when the solution is made in acetic acid.

It would seem to be advisable for pharmacists to make an inspection of their stocks of zinc oxide and to firmly reject all samples containing lead in excess of the U. S. P. requirements. If this be generally done the manufacturers of zinc oxide will have to find some way of supplying the pharmaceutical trade with the lead-free zinc oxide to which they have been accustomed and to which they are entitled. Just as long as pharmacists continue to take whatever is offered to them, no matter how plainly it may be labeled as to deviation from the official requirements, just as long will this sort of thing continue. Zinc oxide containing from 0.1 to 0.5 per cent. of lead is certainly not a proper article to use in making the ointment, and concerted action on the part of pharmacists all over the country would bring about a speedy improvement of this condition.

CONTAMINATION OF WILD CHERRY BARK WITH METALLIC IRON.[1]

By Charles H. LaWall.

A rather unusual contamination of wild cherry bark with particles of metallic iron was recently observed, which may be worth recording because of the unsuitability of such bark for making the official preparations of wild cherry and because of the possibility that other lots of the same kind of ground bark may be on the market and that other pharmacists may have experienced the trouble described below and were unable to account for it.

A lot of wild cherry bark, ground to the official degree of fineness, was purchased by Prof. E. F. Cook, director of the operative pharmacy laboratory of the Philadelphia College of Pharmacy, for use by the class in making syrup of wild cherry. There was nothing suspicious or unusual-looking about the drug and it was used by nearly 100 students in making syrup of wild cherry by the U. S. P. IX method, which involves a preliminary maceration of the ground drug with the glycerin-water menstruum for twenty-four hours. The next day the drug in every one of the percolators was black and the percolate which came through upon beginning the operation looked more like ink than an infusion of wild cherry.

An investigation of the drug showed an ash slightly high but not abnormally so, and in this connection it may be appropriate to note the fact that for some reason the U. S. P. requirement for ash, which is part of the text of other vegetable drugs, is lacking in the case of wild cherry. The ash showed indications of an abnormally high proportion of iron, which was confirmed by comparative colorimetric tests upon the sample in question with another sample which showed no discoloration in making the infusion, dissolving the ash of each in diluted hydrochloric acid, oxidizing with a drop or two of nitric acid and adding potassium sulphocyanate T. S. The normal sample of wild cherry gave but a faint pink color while the abnormal sample yielded a deep red solution.

A 10-gramme portion of the wild cherry was mixed with 100 Cc. of distilled water in a large-sized beaker and the contents, after

[1] Read at the meeting of the Pennsylvania Pharmaceutical Association, 1917.

thoroughly mixing, were given a rotary motion and allowed to settle. Upon observing the sediment which collected in the center of the bottom of the beaker, a number of small black particles were noted, which, when withdrawn and subjected to appropriate tests, were identified as particles of metallic iron, clean and free from oxidation.

Two separate 10-gramme portions of the powder were then taken and a small horseshoe magnet, which had previously been weighed, was used to remove the particles of iron quantitatively. One portion showed 0.025 Gm. and the other portion 0.028 Gm. of magnetic particles of unoxidized iron. The presence of this iron can probably be accounted for by the use of a mill with iron grinding surfaces.

THE NEED OF EMPHASIZING THE VALUE OF PHARMACY.[1]

By Eugene G. Eberle.

That repetition is a power in shaping the affairs of men was recognized from earliest periods and has continued a means for influencing the thoughts and therefore the activities of men and nations. What is said to a person once is readily forgotten, but continued impressions of the same view makes it a part of the individual's reasoning and action. I am not saying this as an apology for attempting to convey to you in this effort a message which is old and has been repeated many times in one way or another, and one that I have spoken and indited on many occasions and repeated several times in recent months, namely, that pharmacy is a profession, and that professional recognition of druggists can only be rightly expected when they practice pharmacy.

A great deal has been said anent this subject recently, and more specifically in connection with the establishment of a pharmaceutical corps in the United States Army. Some things have been mentioned in opposition to the movement and considerable silence obtains on both sides of the question. If pharmacists want professional recognition a sufficient interest must be persistently and insistently exhibited by them, showing that they really desire it. Neither silence, apathy nor indifference are positive arguments.

[1] Read before the Pennsylvania State Pharmaceutical Association, June 19-21, 1917.

That there is a tendency to ignore pharmacy is evidenced by the Government in not having provided even in our present crisis, when the coöperation of every industry and profession is necessary, a place in the army organization for the professional services of pharmacists, on a basis that will prove their value and require of pharmacists to show their ability to be of service.

The government is not alone in this lack of consideration or confidence, it obtains with related organizations in promotions wherein pharmacy should have a part. A letter of Dr. Edward Kremers to the American Pharmaceutical Association under date of March 27, 1917, points out such attitude or disregard by constituted bodies or associations; pharmacy was ignored in the Committee of One Hundred, organized for the purpose of starting a movement looking toward the establishment of a Department of Health and Sanitation with a cabinet officer at the head. Again, in the Committee of the National Research Council, appointed by the National Academy of Sciences, pharmacy was not included, though even astronomy was thus honored. A movement has been started for organizing an institute for the history of science and civilization, where again one looks in vain for the name of a pharmacist. The concluding statements by Doctor Kremers are quoted in full:

"All that I wish to point out is that the emphasis of commercial pharmacy, while it may place a dollar in our pockets to-day, is ruining our future as a calling. Not only are we ignored in the national movements referred to, but we are losing locally. Fifteen years ago, the food and dairy commissions took over part of the duties of our state boards of pharmacy and thereby deprived our calling of so much home rule. To-day the state boards of health are ready to take over what little self-government remains.

"Our state boards were told twenty years ago that unless they made a serious business of drug-store inspection, this aspect of self-government would be turned over to our food and dairy commissions. For some years past they have been warned that the tendency to concentrate state commissions and related offices would affect them and that they should get ready to take a leading part in this constructive movement. They have heeded neither warning and are now facing control by the medical profession as well as food and dairy commissions."

A profession is a vocation in which a professed knowledge of some department of science or learning is used by its practical application to affairs of others, in serving their interests or welfare in the practice founded on it. Accepting of this definition, pharmacy can certainly enroll. For this association, it is unnecessary to give

examples of pharmacists who can eminently qualify or of those who in the past have measured up to this definition. But may we not say to ourselves, and repeat frequently, that we should have a higher professional appreciation of pharmacy, of all who serve devotedly and a greater reverence for those whose work has given us a profession.

A few weeks ago a visitor from this section of the country was one of the speakers at a banquet in San Antonio, Texas; it was probably expected of him that he should dwell upon another topic, for in his introductory remarks, he said:

"I am going to take a woman's privilege and change my mind. The thing which brought me to Texas is dear to my heart, but there is another thing which is far, far dearer to it. I am coming to you, loyal citizens of Texas, with an appeal upon my lips. I am going to beg your indulgence and your interest in behalf of a friend who needs more friendships. This one has many sons and daughters; he has reared them to competence and great estate, but they have not always remembered this. My friend is the United States, my country, your country, our country. And to-night for a little time I am going to ask you to forget San Antonio, Bexar County, and Texas and give your loving thought to the United States which stands for and behind each of them."

The speaker then referred briefly to community pride, expressed in a more distinctly commercial form which leads to campaigns of preferential movements. If these are held within rational bounds the promotion is commendable and valuable, but when it fundamentally lacks economic soundness, it defeats the purpose,—also when the interest of the community is the sole thought of the citizenship then the national spirit suffers, and this is essential in our present crisis.

It seems to me that these thoughts can be made more or less applicable to pharmacy and also to association interest. You will replace the words of the speaker "the friend who needs more friendships" by pharmacy and the American Pharmaceutical Association, and I will in a limited way endeavor to make use of them. If the remarks are not applicable to you, they may have application elsewhere and are not altogether unworthy of attention.

Practically, ever since there have been places for dispensing medicines and selling drugs other articles have formed part of the stock of the apothecary, for reasons that require no explanation. We are accustomed to speak of two divisions in the drug business, the commercial and the professional. The stocks of drug stores

are characterized by environments and the inclinations of the owners, how these are constituted, what proportion of the business is commercial or professional varies accordingly, and your information on the subject is likely more authentic than mine. This much may be said, however; that the necessity for a living profit or desire for doing a large volume of business has developed the commercial side of the drug business relatively more than the professional. This is a natural sequence, predominating attention to one side must of necessity weaken the other, and economic conditions have had a large part in shaping the drug business. In the constant attention to the development of the business there is apt to be a neglect of pharmacy, but it has or deserves to have a more important place in the drug business than the immediate revenue which may be derived from it warrants, but there is another side to the proposition. The public buys merchandise in drug stores because of their convenient locations and services; there is, however, the dominance of well-founded opinion, that accuracy and dependability obtain in connection with pharmacy. This contributory value or asset deserves our thoughtful consideration, we need more of the spirit of pharmacy. However much our efforts may be directed toward an increasing trade, whenever special or selective privileges are desired, we at once turn our attention to the argument that we are pharmacists, that special training has qualified us for certain work that should only be delegated to pharmacists. Pharmacy is the *alma mater* of the drug business, and is entitled to our constant consideration, not only in time of trouble when there is urgency for a qualified witness in our behalf. Pharmacy may need the side-lines of the drug business for its continuance, but surely the successful conduct of these departments is dependent on pharmacy. Repeating, the importance of the professional side of the drug business cannot be measured by the direct income supplied thereby but more so in that pharmacy characterizes the business.

Another thought: in the constant application to business affairs we forget those who are more intensely devoted to the research work of pharmacy and lend only little encouragement to our pharmacy schools. The value of pharmacy to the world rests not only on our own efforts, but on the labors of those who make and have made present-day progress attainable. We should not be unmindful of those of our profession whose achievements have influenced pharmacy and the related industries and of those whose discoveries

afford relief to the wounded, save and conserve the lives in countless homes and on the fields of battle. Our profession must live in the reverence we have for our precedents, in the work they made possible for us to do, because of it, and *our own* endeavors. A profession without ideals is dead, is useless.

We may point with pride to past records of pharmacy, but we ourselves must sustain its reputation, continue to improve it and make it increasingly valuable to the world. The votaries are the makers of the business they are engaged in, and in turn the character of it tells who and what they are.

Repeating my own words of a former address, associated service profits the individual who lends a helping hand in the promotion of the common interests of pharmacy more than if he had directed his activities without concerning himself with the interests of others, and this is relatively true as between associations. It should be the spirit of those engaged in the drug business whether they are most concerned in commercial lines or in professional pharmacy and should be the inspiration upon which we shall be lifted step by step to greater, broader and more hopeful things while laboring for our own interests, those of pharmacy and the welfare of human kind. Applying the same thought to coöperation among associations, such endeavor, if properly directed, should produce enhanced relative value, comparable to work of members within an association—the "work together proposition" is an essential factor for greatest success. We are generally agreed that the common interest of an association should be the interest of the individual member; so the interest of different associations having the same or closely related objects in common can be directed by harmonious coöperation for profit of each association and every individual is thereby benefited. It is this thought I want to impress, that the individual effort is enhanced by association work, so also "the work together" of associations has an increased relative value. The various drug associations should provide a plan linking them to the *alma mater* of associations, the American Pharmaceutical Association, and thereby greater work can be accomplished for pharmacy, the drug business in general and in the interests of those whom we serve. Such organization will afford greater opportunity for coöperation of the allied interests, to shape and regulate the drug business in general

on a rational basis and at the same time conduct or direct research work for all concerned.

In applying the points made at the beginning, pharmacy is the *alma mater,* from which have sprung the children—the various departments of the drug business. Too much consideration of these, too much enthusiasm because of their prosperity is apt to bring neglect of pharmacy. The realization of the dereliction comes when an effort is made to secure recognition on account of what should be the most important part of the drug business and is, too often perhaps, a very small part of it. The American Pharmaceutical Association and pharmacy have no easy task, they need and are entitled to the support of every one in the drug industries, because of their importance in sustaining them. I am loathe to decry commercial enterprise when it is kept within seemly bounds, but it must not be forgotten that however important and essential, the commercial departments of the drug store are still superstructures in the drug business resting upon and dependent for life on pharmacy.

Continued success demands efficient direction, and this is not possible in the drug business when pharmacy is not heartily supported. No department of the store should be planned without giving consideration to the pharmacy of it. This is real team work that requires watchful coaching; using a base-ball aphorism, "team score has right of way over the individual record." Make it apply both to pharmacy and the American Pharmaceutical Association. The present seems to be a most opportune time for securing a better recognition of the services of pharmacy and pharmacists; let us use our pharmaceutical energy and professional enthusiasm in that direction.

"If ever you feel that you gladly would shirk
The task that is set for the day,
Some fellow will offer to take on your work
While you go your own chosen way."

SOME PHARMACOPEIAL ENGLISH.[1]

By George M. Beringer, Jr., P.D.

The writer's attention was recently directed to the following advertisement which appeared in a leading New York daily:

"Girls wanted to sew buttons on the second floor."

Still more recently, he has been amused to find English of the same character scattered throughout the Pharmacopeia.

In the preface, the statement is made that

"The Convention recommended the insertion of *microscopical descriptions* of powdered drugs."

What a joy such descriptions would have been to students looking for "short cuts." What is meant, however, is that the Convention recommended the insertion of descriptions of the *microscopical characteristics* or *elements* of powdered drugs.

We are told that trichloracetic acid contains not less than 99 per cent. of $C_2HO_2Cl_3$ "when dried in a desiccator over sulphuric acid." To the novice it would appear that the desiccator and not the drug must be placed over the acid. It would have been better to have said: when dried to constant weight, *over sulphuric acid,* in a desiccator.

Adeps lanæ is directed to be the "purified fat of the wool of the sheep (*Ovis aries* Linné, Fam. Bovidæ) freed from water." Are the sheep to be freed from water or is it the fat that is to be so freed? If the sentence read: the purified and *water-freed* fat of the wool of the sheep, there could be no doubt.

Likewise, adeps lanæ hydrosus is stated to be "the purified fat of the wool of the sheep (.....), combined with not less than 25 per cent. nor more than 30 per cent. of water." The sheep would hardly combine with such an amount of water, therefore, it would be better to say: a combination or mixture of not less than 25 per cent. nor more than 30 per cent. of water with the purified fat of the wool of the sheep.

In giving directions for the testing of ether for peroxides, the operator is instructed to "shake the ether, ..., in a

[1] Read at the meeting of the New Jersey Pharmaceutical Association, Hotel Breslin, Lake Hopatcong, June 14, 1917.

glass stoppered cylinder previously rinsed *with the ether under examination.*" Does this mean that the operation of rinsing the cylinder must be under examination? If so, by whom? To the initiated, of course, it is plain that, with the ether, *which* is *being tested,* is meant.

There is one direction in connection with the preparation of liquor calcis which is destined to become famous: "Pour the liquid, holding the undissolved calcium hydroxide, in suspension, *into a tightly-stoppered bottle.*" Unfortunately, we are not told how this difficult feat can be accomplished. It should read: into a bottle *capable* of being tightly stoppered.

The faulty construction is particularly noticeable in the definitions of many of the newer drugs of animal origin. Thus, hypophysis sicca is "the posterior lobe obtained from the pituitary body of cattle, cleaned, dried and powdered." Why is it necessary to clean, dry and powder the cattle in order to obtain this small portion? Why not say, The *cleaned, dried* and *powdered, posterior lobe* of the pituitary body of cattle?

Suprarenalum siccum are "the suprarenal glands of animals used for food by man, cleaned, dried, free from fat, and powdered." Must man suffer such torture in order to be medicated with suprarenal glands?

It is also noteworthy that all the animals used for food by man are included. Fowl and fish are animals, but a well-posted veterinarian informed the writer that there is no mention in the literature of their having suprarenal glands. If they have such glands, the glands are not used medicinally.

The definition of thyroideum siccum is constructed on similar lines: "the thyroid gland of animals, which are used for food by man, freed from connective tissue and fat, dried and powdered." One might imagine the horror in the soul of a foreigner, with only an academic knowledge of English, should he interpret this statement literally. What amazement would be his at such strange American customs!

The directions for preparing albumen test solution read:

"Carefully separate the white of a *strictly fresh hen's egg* from the yolk."

In the directions for the determination of the ash of vegetable drugs, the following is given:

"Finally determine the weight of the ash, deducting the weight of the ash from the filter."

What is meant is: deducting the known weight of the filter ash from the weight of the total ash.

In the directions for the biological assay of cannabis, the statement is made that

"It is best to make preliminary tests upon several dogs with average-sized doses."

What part of the dogs are the doses? Why not say "*using* average-sized doses"? The statement is also made that

"Before administration the animal should not be fed for twenty-four hours in order to hasten absorption."

To whom is the animal to be administered? Why not say "before administration *of the drug,* and, better yet, change the position of the phrase.

There must be a hoodoo about cannabis for, in the preface, the following appears:

"The biological assay for pituitary solution and cannabis and its preparations is a requirement."

Does the same assay answer for both drugs? The form should be: The biological assay *of* pituitary solution and *of* cannabis is required.

In the paragraph on "Nomenclature" after mentioning the insertion of abbreviations of official titles, the following is given:

"It *was* believed that these *will* be of service, etc."

Here we have an entirely unnecessary and incorrect change of the tense of the verb.

The Pharmacopeia of the United States of America, in so far as the science and art involved are concerned, is as nearly perfect as human knowledge and ingenuity can make it. In fact, it has been called by certain foreign pharmacists the "autocrat among Pharmacopeias." It is, therefore, all the more to be regretted that the English of the work is not more perfect.

The writer has not attempted to note all the errors of this character in the book. In connection with such as he has noted, however, he has attempted to give constructive criticism, in the hope that more attention may be given to the English of the next revision.

TWENTY-FIFTH ANNIVERSARY OF THE H. K. MULFORD COMPANY.

In 1887, H. K. Mulford, recently graduated from the Philadelphia College of Pharmacy, purchased the drug store at 18th and Market Sts., Philadelphia, from the then owners, Remington and Sayre. He conducted the business under the firm name of H. K. Mulford and Company.

Two years later Milton Campbell bought a half interest in the business and in 1890 E. V. Pechin associated himself with them. Like Mr. Mulford, the new partners were graduates of the Philadelphia College of Pharmacy. At this time the firm's largest assets were an invincible determination to do business as well as it was possible to do it, and in an outlook far wider than might be expected from their age and experience.

It may be interesting to note that the little corner drug store at 1800 Market St. had an interesting history. Professor Joseph P. Remington, Dean of the Philadelphia College of Pharmacy, may well be deemed the Nestor of his profession. Dr. Lucius E. Sayre is the present Dean of the Faculty and Professor of Pharmacy in the University of Kansas Their predecessor, W. J. Simes, was the first rectifier of camphor in America, the store passed to him from Henry Bower, a pioneer manufacturer of glycerin, and he in turn took title from Samuel Eastlack, the first manufacturer of medicated lozenges.

This business history dating back to 1826 was necessarily a stimulant to the young firm and results show that early in their career they resolved to live up to their ancestry, and that they held steadfast to their resolution is evidenced by the fact that today, after a lapse of twenty-five years, the young men who presided over the retail drug store are the arbiters of the destinies of a two million dollar corporation, a corporation favorably known in every quarter of the globe.

Mr. Milton Campbell is the president, Mr. H. K. Mulford the vice-president, and Mr. E. V. Pechin the secretary of the H. K. Mulford company.

This, in itself, is quite uncommon, and when we add the statement that the original members of the firm have through good and bad times, through all troubles and reverses, through all periods of

prosperity kept their heads and grown nearer each to the other in trust and friendship, it becomes apparent that the celebration of the twenty-fifth anniversary of their business career is a red-letter day indeed.

It is proper at this time to review the work of the company during its adolescence in order to determine to what extent the ambitions of the past have become the attainments of the present.

The success has been undoubted, almost unprecedented in the history of manufacturing pharmacy. The acorn of 1891 is the sturdy oak of 1916, and it becomes us to seek the cause of this continued and rapid growth. We believe the answer may be found in a single word—*service*.

The firm has from the first day conducted its business with a determination of doing it as well as possible, believing that more than a business—a trust—had been committed to the care and guidance of its members. For some years the H. K. Mulford Company was engaged in the manufacture of pharmaceutical preparations only, and the improvements instituted in the production of compressed and friable tablets, effervescent salts, elixirs (at one time a leading specialty), fluid and solid extracts, tinctures and ointments gave prominence to these productions of the firm at an early period of its history, and the Keystone label became recognized as the standard of quality. At the time of which we are now writing it was the custom to throw a veil of secrecy around the formula and preparation of pharmaceutical specialties and to claim virtues for them that existed only in the imagination of their proprietors.

The H. K. Mulford Company, recognizing that pharmacy was but a department of the science and art of medicine; realizing its responsibilities to the medical profession and the public; believing itself bound by the Hippocratic Oath, and, regarding medical ethics as a unity, one and indivisible, placed the formula of every preparation on its container and confined its statements to quotations from physicians, who prescribed them. *Here as always decency had its reward.*

While the work of the Mulford laboratories in pharmacy and pharmacology alone would entitle the firm to the very highest standing, it did not remain content with those spheres of activity, and in the year 1894 instituted the first commercial laboratory in the United States for the preparation of biological remedies.

The first product of the new laboratories was diphtheria anti-

toxin. The physician specifies "Mulford" if he desires the most potent and sterile product. If he would use an American product in 1894 he specified Mulford for the reason that it was the only source of supply, today he demands the Mulford brand because he knows that it is an absolutely safe source of supply.

It is not an idle play with words to say that "diphtheria antitoxin" suggests "Mulford" and "Mulford" "diphtheria antitoxin." We believe that this first born product of the Mulford biological laboratories is today the most concentrated, safe and sterile product of its kind.

The H. K. Mulford Company was the pioneer in the work of physiological testing and chemical standardization of pharmaceutical products, and the present status of these methods of determining drug values may be said with due modesty to be largely owing to the work of the Mulford laboratories. Here the firm has always led, and at the present time it physiologically tests and standardizes every drug lending itself to those methods. Much of the results of this work have been given to the medical profession through the medium of "working bulletins" and the demand for these for use of medical schools is quite large, and, it is needless to say, cheerfully supplied, as a contribution to medical progress.

This Mulford Working Bulletin System receives universal recognition, is kept thoroughly up-to-date and, we may further state in this connection, that one of the most common, and we are glad to add, most pleasant duties of our scientific staff is to afford information of the character outlined above, to the medical, veterinary and pharmaceutical professions.

Not only was the H. K. Mulford Company the pioneer producer of diphtheria antitoxin on a commercial scale, but it has been and still is a consistent and continued worker on the problem of its improvement, and the product of today concentrated, sterilized, highly potent, furnished in sterile containers, leaves little to be desired.

The production of diphtheria antitoxin was quickly followed by tetanus antitoxin, antistreptococcic serum, the tuberculins (human and veterinary), until at this anniversary period the Mulford bacteriological laboratories furnish practically every known and used bacteriological remedy, all of them prepared with Mulford care and of Mulford quality.

A notable instance of the improvements made in bacteriological therapeutics is found in the work of the Mulford Veterinary Laboratories, on hog cholera serum, as they have succeeded after long and expensive experimentation in furnishing for the first time, two sera, one a potent, sterile serum, free from corpuscular debris, the other a trebly concentrated clear, potent sterile hog cholera serum globulin. The value to the community of this work alone is incalculable.

In 1908 the firm established a veterinary department to meet its very large and increasing veterinary business, and the Mulford combined Price-List and Visiting List, the *Mulford Veterinary Bulletin,* and the Mulford veterinary products are known and appreciated in all parts of the world.

The firm also publishes the *Mulford Digest,* dealing with problems of interest to the physician and bacteriologist.

Perhaps the most striking evidence of the growth, solidity and altruistic prescience of the company is to be found in the beautiful and complete biological and bacteriological laboratories at Glenolden, Pa. Here, on about one hundred and seventy-five acres of charming, rolling suburban country, watered by a clear, never-failing brook, and shaded by noble trees, the firm has built the most artistic and sanitary biological laboratories to be found in the world. No expense has been too great to make this plant at once ideally beautiful and useful, and it is most interesting to the visitor, passing from one complete unit to another, to observe that every provision has been made for the pleasure, health and comfort of the employees. Base ball grounds, tennis courts, dining hall, lecture room, rest rooms, testify to the firm's desire to make the work of its scientific staff as pleasant as possible, and we may add that a course of lectures are given every season, on subjects bearing directly or indirectly on the work in hand, many of the lecturers being scientists of national reputation brought to Glenolden at great expense.

On portions of this beautiful estate drugs are grown alike on a commercial and experimental scale, the firm being desirous to assure itself of the highest quality for use in pharmaceutical laboratories, and also to further the interests of pure science, by the endeavor to so cultivate the different plants as to increase their yield of active principles. This work is necessarily an expense, not a profit, and we may add that much of the work of the bacteriological, biological and pharmaceutical laboratories is devoted to the elucidation of

problems of purely scientific interest. As examples of these we are justified in mentioning the making of auto vaccines, from strains of bacteria furnished by the medical and veterinary professions, the manufacture of rare sugars used in bacteriological work, research work in chemistry and pharmacy, that almost never yields commercial results, although helpful to the science of medicine, the maintenance of a library, whose shelves are crowded with the best results of medical thought; and the training of its employees, by a source of lectures and demonstrations on scientific subjects, and in languages that may be useful to them in making a career.

The scientific staff is large, we believe we may say of national reputation, most of them are engaged in teaching departments of medicine in schools of the highest grade, they are voluminous and constant contributors to medical and scientific literature and they are absolutely untrammeled. Freedom of speech and thought is encouraged, and every facility is afforded them for research work of the most varied and advanced types.

As the business of the H. K. Mulford Company has grown it has been necessary to establish branch houses in convenient centers where full stocks of the Mulford products may be obtained, with a minimum of friction and delay, and the physician or veterinarian, whether in New York, Seattle, San Francisco, Mexico, London, Japan, Adelaide, or Buenos Aires, has equally ready access to the products of the house.

What of the future? What will be the extent? What will be the status of The H. K. Mulford Company when in 1941 it celebrates the fiftieth anniversary of the foundation of the house?

We cannot tell. This much however seems assured: the same policies will prevail, the firm will still clearly recognize that it is engaged in a useful, educational propaganda, doing whatever is possible for the advancement of medical knowledge and the encouragement of medical research, and so, on this our twenty-fifth birthday, with every assurance and every hope for continued progress of that great factor in medical, pharmaceutical, chemical and bacteriological science we leave you with best wishes.

BOOK REVIEWS.

A COURSE IN FOOD ANALYSIS, by Andrew L. Winton, Ph.D. First edition. New York: John Wiley and Sons, Inc., 1917. $1.50 net.

Dr. Winton is well known as the author of several standard works on the microscopy of technical products and as an analyst of long experience. He has been well trained and understands very well what a practical course in food analysis should include. No one is better qualified to write a work of this kind and its appearance at this time is extremely fortunate. The object of the book is to equip the chemical student so as to become a professional food analyst. The value of a good microscopical course is not generally appreciated in courses in chemistry. The use of the microscope in connection with technical analyses is always of some benefit and not infrequently is of paramount importance.

Dr. Winton's book contemplates a course of forty laboratory periods, which supplementing the courses in qualitative and quantitative analysis, will furnish an adequate insight into the composition and microscopic structure of products needed in everyday life. There are ten chapters, which include the consideration of the principal food substances. They are as follows: (1) Introduction. (2) Dairy Products: Milk; Butter; Cheese; Condensed Milk; Ice Cream. (3) Meat, Fish and Eggs. (4) Natural Vegetable Foods and Mill Products, including Cereals; Legumes; Oil-seeds; Vegetables; Fruits; Nuts; Spices; Flour; Yeast and Baking Powder. (5) Microscopic Examination of Vegetable Foods, including Wheat Starch; Oat Starch; Bean Starch; Corn Starch; Potato Starch; Cassava Starch; Wheat; Rye; Oats; Corn; Buckwheat; Peas; Cotton Seed; Flax Seed; Black Pepper; Cayenne Pepper; Cinnamon; Ginger; Coffee; Cocoa; Tea and Mixtures. (6) Saccharine Products, including Sugar; Molasses; Syrups and Honey; Maple Products and Fruit Syrups. (7) Fats and Oils, including Edible Fats and Oils. (8) Fruits, Fruit Products; Liquors and Vinegars, including Fruit Juices; Wine; Cider and Other Liquors; Vinegar and Various Fruit Products. (9) Flavoring Extracts, including Vanilla Extract and Substitute Lemon Extract; Orange; Almond; Wintergreen; Peppermint and Spice Extracts. (10) Coffee; Tea and Cocoa, including Substitutes; Chocolate and Cocoa. The selection

of material is excellent and there is a very happy combination of microscopical technique and chemical methods of analysis. The students that will be most benefited by this work are the chemists, and this is probably the first time that a work has been published in this country which could be recommended generally for university and college courses. HENRY KRAEMER.

SCIENCE AND LEARNING IN FRANCE, with a Survey of Opportunities for American Students in French Universities. An Appreciation by American Scholars. A Society for American Fellowships in French Universities. 1917.

This work is dedicated to the scholars of France, worthy custodians of their country's intellectual greatness. It is prepared in a time when France has reached the heights of moral greatness and is offered with heartfelt admiration and sympathy in the name of the scholars of America. The editor-in-chief is Dr. John H. Wigmore, of Northwestern University. He with a corps of authors have placed before the American public the contributions of France in all fields of scientific knowledge. The purpose of this volume is to show the status of France in the forefront of the world's progress and to furnish American university students all information bearing on graduate work in France.

Each chapter sets forth briefly, for a particular field: (1) The record of French scholarship during the past century; the notable achievements; the eminent leaders; the special lines of development; in general, the share of France in the world's progress. (2) The courses of instruction given, now or recently, at the universities of France, particularly at the University of Paris; the names of the most important scholars, with mention of their principal contributions and of the special fields of research over which they preside. (3) The facilities available for study and research, including the libraries, laboratories, archives, and museums, the auxiliary institutes, special schools, and learned societies and committees.

There is also an introduction, describing the general intellectual spirit of France and Paris, and the interest and attractions that capital and country offer to the foreign scholars; and an Appendix, describing the organization of French universities, the standards of preparation expected of the student, the system of degrees, the custom as to residence and attendance, the regulations as to fees and the like; and other facts useful to the visiting student.

The book has been made possible by the liberality of the Society for American Fellowships in French universities, which has borne all expense of publication.

The master minds of France have not only enriched their own country, but have stimulated, developed and sustained the best thought throughout the world. The American people have always been grateful and thoroughly appreciative of Lafayette and the other noble French men whose unselfish efforts made possible the establishment of this republic. Many of our institutions of learning have been modelled after the famous schools of France. The Philadelphia College of Pharmacy in its early days showed a strong leaning toward the French attitude in the development of the Ecole Superieure d'Pharmacie. The AMERICAN JOURNAL OF PHARMACY was inspired by the *Journal de Pharmacie et Chimie* and for many years the prevailing abstracts were from French authors. The School of Pharmacy of Paris, with its group of eminent scientific men, is the leading institution of pharmacy in the world. "A notable figure is that of Guignard, pioneer in modern morphology, whose discoveries and technique in this field are surpassed in no laboratory. His material includes chiefly the higher plants, but associated with him is Radais, an authority in cryptogams. The whole range of plant morphology, therefore, is presented by these two investigators."

Similarly in chemistry we have Béhal, an organic chemist, who among other subjects, has studied unsaturated compounds and creosote, author of "Traité de Chimie organique" (2 vols., Paris, 1909–1911, 3d ed.); Gautier, known for various investigations in organic chemistry, in chemical toxicology, and in hygiene, author of "Cours de Chimie organique" Paris, 1906, 3d ed.), "Ptomaines et leucomaines" (Paris, 1866), and "L'Alimentation et les regimes chez l'homme sain et chez les malades" (Paris, 1904); D. Berthelot, author of important researches on the theory of gases, the determination of molecular weights, and photochemistry; Moureu, a student of the rare gases of the atmosphere, and an eminent organic chemist, author of "Notions fondamentales de Chimie organique" (Paris, 1902); Bourquelot, whose researches upon enzymes are well known, author of "Les Ferments solubles" (Paris, 1896), Villers, Guimbert and Lebeau.

H. K.

INCOMPATIBILITIES IN PRESCRIPTIONS. For Students in Pharmacy and Medicine and Practicing Pharmacists and Physicians. By Edsel A. Ruddiman, Ph.M., M.D. Fourth edition, thoroughly revised. New York: John Wiley & Sons, Inc.; London: Chapman & Hall, Limited. 1917.

Dr. Ruddiman's work is very well known and has met with great success. The subject is one of a fundamental character and Dr. Ruddiman has handled it very aptly. The arrangement is very excellent, so that when one meets with incompatibilities in prescriptions he can usually determine the nature of it, and provide a remedy. In the fourth edition a number of new remedies have been included and a number of prescriptions have been increased.

The table in previous editions, giving the average price charged for prescriptions has, through the courtesy of the editor of the *N. A. R. D. Journal,* been replaced by the schedule adopted by the National Association of Retail Druggists.

H. K.

WHITE'S VEST POCKET SUNDÆ FORMULARY. A collection of original and carefully selected standard formulas for the preparation of plain and fancy sundæs and the manufacture of dressings and toppings, arranged in alphabetical order so that they may be instantly accessible. Over 1,500 formulas. By E. F. White. 200 pages, 3x6 inches. The Spatula Publishing Company, Boston. Price $1.

The author of this compact and handy little volume is the best known writer on subjects connected with the soda fountain in America. He says in his preface: "The time has come when a book is needed which the dispenser can carry in his pocket so that he may have instant access to simple directions for preparing hundreds of sundæs. There are so many he cannot possibly carry them in his head. The traveler from another city steps to the counter and asks if a sundæ popular in his city is served. Often all the necessary ingredients are at the dispenser's disposal, but he is compelled to say 'No,' when a glance into a pocket guide would enable him to prepare it, and thus give greater satisfaction to the customer. Again, this is the day of new things. People like something a little different and many dispensers like to put something new on their menus as a special every day or every week. This guide will give a new for-

mula for every day for four years or for every week for twenty-five years."

The book is certainly unique in that nothwithstanding its great number of pages it is only about a quarter of an inch thick and may easily be carried in the vest jocket. Any dispenser who wishes to get out of the ruts will find this unusual book just the thing to help him accomplish his object.

NEW AND NON-OFFICIAL REMEDIES, 1917, Containing Descriptions of the Articles which have been Accepted by the Council on Pharmacy and Chemistry of the American Medical Association Prior to January 1, 1917.

We have in times past referred to this publication as a handy "little" volume, but if it keeps on growing and enlarging its sphere of influence, so to speak, this term will cease to fit it. We always look forward to the appearance of this book. It and the supplements appearing from time to time in the *Journal of the American Medical Association* are things that we have depended on for some years to keep us informed as to the newer remedies. Without this book on our work shelf we would feel lost. Not only will be found the newer remedies but also the most up-to-date results of investigations of the well-known and tried drugs known to scientific medicine.

When in search of information bearing on the therapeutic activity of new drugs and preparations in the interest of his medical clientele the conservative pharmacist will do well to consult this book. No claims are permitted in it that cannot be demonstrated as facts or backed up by reasonable evidence. In short, for the seeker after proprietary medicinal knowledge this book is a reliable and ready source of information.

The present volume, like its predecessors, is right up to date. On page 141 there is a full description of the Carrel-Dakin solution and the technic for making it, and on the preceding page a full description of sodium para-toluenesulphochloramine, or chlorazene, as it is sometimes called. This is really no new thing as it was made first by Chattaway in 1905.

JOHN K. THUM.

ANNUAL REPORTS OF THE CHEMICAL LABORATORY OF THE AMERICAN MEDICAL ASSOCIATION, Volume 9, January–December, 1916.

The volume under consideration is composed of reports of work performed the past year and not the least interesting of these reports are those bearing on "Wine of Cardui." From page 39 to 103 the analysis of this nostrum is gone into very thoroughly. The reports of more than nine different chemists are given in detail.

After careful reading of these one is convinced that the investigation of this much-vaunted preparation was thorough in every way and helped very materially in the great moral victory won by the Association in the suits brought against it by the Chattanooga Medicine Company. It is unnecessary to add that many of these analyses of "Wine of Cardui" were made by chemists having no connection with the laboratory of the American Medical Association.

Part I of this volume contains a reprint of a paper by W. A. Puckner, Phar.D., read at the Detroit meeting of the Association held in June, 1916. Dr. Puckner is the director of the laboratory. In this paper he relates very clearly and fully the scope of the work performed by the laboratory and its great usefulness to the medical profession, and that, despite the limited facilities at its disposal. Notwithstanding this the laboratory is glad at all times to answer all inquiries for information. In some of the problems brought to its attention, as for instance, those of a purely local nature, it tries to gain the coöperation and the investigation of such problems by city or state authorities.

It is becoming increasingly evident that the work done by this laboratory, to say nothing of the importance and usefulness of the Council on Pharmacy and Chemistry, is appreciated by the medical profession more and more every day. J. K. T.

PHILADELPHIA COLLEGE OF PHARMACY.

MINUTES OF THE QUARTERLY MEETING.

The quarterly meeting of the Philadelphia College of Pharmacy was held June 25, 1917, at 4 P.M. in the Library, the President, Howard B. French, presiding. Sixteen members were present. Regrets were received from Joseph L. Lemberger and H. K. Mulford for inability to be present.

The minutes of the annual meeting held March 26 were read and approved.

The minutes of the Board of Trustees for meetings held in March, April and May were read by the Registrar, J. S. Beetem, and approved.

The Committee on Necrology, by its chairman, Professor Henry Kraemer, presented their annual report, giving in detail biographical sketches of Martin I. Wilbert, Samuel E. R. Hassinger and Frederick Gutekunst, members who had died during the year, when, on motion, the report was referred to the Committee on Publication (see AMERICAN JOURNAL OF PHARMACY, page 379).

REPORT OF DELEGATES TO THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION MEETING HELD AT PITTSBURGH, JUNE 19–21.

In the absence of the chairman, Professor J. W. Sturmer, Dr. F. E. Stewart reported verbally that the meeting was a very successful one. The attendance was large, many interesting papers were read and the social features as usual were very much enjoyed. Dr. Stewart further said that one of the most discussed subjects was the status of the pharmacists in the army and navy. The rank and pay of pharmacists in the navy had been very much improved of late years, but for the army there was much yet to be desired for the pharmacists. An interesting and instructive discussion followed the remarks of Dr. Stewart on this subject, which was participated in by Messrs. Beringer, French, LaWall, Kraemer, Lowe and Dr. Stewart. In this connection President French stated he had forwarded to army headquarters a series of resolutions that had been adopted applying to this subject, which had been acknowledged by the government in a reply by General Crowder in which he defined the present status of the pharmacists in the army and navy.

Report of the delegates to the New Jersey Pharmaceutical Association at its meeting held at Lake Hopatcong was made verbally by Mr. George M. Beringer. There was a very interesting program; legislation of state and national interest was largely considered. The illustrated lecture by Professor Kraemer and a paper by Professor E. F. Cook added much to the success and enjoyment of the meeting. Mr. Beringer further said the Association was a strong one, and very much alive and active in promoting pharmacy and the field was a good one in which to urge the advantages of the

Philadelphia College of Pharmacy to those seeking an education in advanced pharmacy.

Professor Henry Kraemer presented the bank book, cancelled check and correspondence relating to the contributions made by members of the College and others for Belgian pharmacists who had suffered from the present war. Also a letter from Professor P. van der Wieler acknowledging the receipt of the draft forwarded by Professor Kraemer, the treasurer of the fund, thus closing the account.

Mr. Beringer said he noted the absence of the dean, Professor Joseph P. Remington, because of illness, and moved that the Secretary be directed to convey to him the sincere regret of the members at his enforced absence, which motion was unanimously adopted.

President French alluded to the coming meeting of the Conference of Pharmaceutical Faculties to be held at Indianapolis August 27–28, and said the major faculty of the College were members of the Conference and that previously they had attended the Conferences only in an advisory capacity; that it was always understood that they were not to commit the College to any line of action.

President French then made the following appointments:

Committee on Necrology: Professor Henry Kraemer, chairman; Edwin M. Boring and C. A. Weidemann (reappointed).

Committee on Nominations: Professor C. B. Lowe, chairman; C. Stanley French, Mitchell Bernstein, F. E. Stewart and C. A. Weidemann.

Delegates to the American Pharmaceutical Association at Indianapolis August 27–September 1: Professor J. W. Sturmer, chairman; E. F. Cook, Henry Kraemer, Chas. H. LaWall, Frank X. Moerk, Freeman P. Stroup, Dr. F. E. Stewart, Charles E. Van der Kleed.

Mr. Beringer asked as to the status of these delegates, as it had been said that only delegates to the house of delegates would be recognized, to which the Secretary replied that for some years past the Secretary of the American Pharmaceutical Association had forwarded to him blank forms of credentials with the request to send the names of appointed delegates.

Professor Kraemer exhibited same handsome specimens of squill bulbs, and read the following letter:

NEW YORK, June 20, 1917.

Dear Professor Kraemer: The other day at the florist's who gets all my spare change, and some that I can ill spare, I ran across some bulbs of *Scilla maritima,* as it was so labeled by him, but I think it is now called *Urginea Scilla.* I took a few home and am sending you a couple, thinking you might care to try them. I don't know that they are a novelty, but I have never before seen them offered for horticultural purposes.

Yours cordially,

CASWELL A. MAYO.

The bulbs attracted considerable attention when Professor Kraemer remarked they were official squill bulbs, when, on motion, the Secretary was directed to convey the thanks of the College to Mr. Mayo for his gift.

C. A. WEIDEMANN, M.D.,
Recording Secretary.

COMMITTEE ON NECROLOGY.

Probably never in the history of pharmacy has our profession been struck so hard by reason of the deaths of its members as during the past year. Our College has been among those thus afflicted and has suffered severe losses.

The death of Mr. Wilbert was so sudden it shocked the entire pharmaceutical world. He was in the prime of life, and just about ready to participate in some of the undertakings that would mean great advancement for American pharmacy. The appreciative memoir of Mr. Wilbert by Mr. Thum and which was published in the AMERICAN JOURNAL OF PHARMACY in February records the career of one of the Philadelphia College of Pharmacy's most ablest sons. The resolutions offered by various pharmaceutical, professional and scientific organizations reveal the esteem in which he was held by all of those with whom he labored.

FREDERICK GUTEKUNST.

Frederick Gutekunst, acknowledged as the dean of American photographers and who had a world-wide reputation, died on April 27, 1917. He graduated from the Philadelphia College of Pharmacy in 1853 and was at the time of his death the representative of

the oldest classes of the alumni. The name Gutekunst means "good art." His father came from Germany about the early part of the last century and settled in Germantown. After receiving a common-school education, young Gutekunst worked for Avery Tobey, a druggist at 1215 Market Street. While in this store he gave some attention to chemistry and electricity—the latter a science which had not then advanced much beyond electro-plating, electrotyping and telegraphy. Daguerreotypes, although they had been made for several years, were still regarded as great curiosities. Mr. Gutekunst conceived the idea of making copper electrotypes from daguerreotypes, and succeeded in doing so, though the process did not become of commercial value.

Mr. Gutekunst graduated from the Philadelphia College of Pharmacy in 1853, his preceptor at that time being William M. Powell, of Germantown, Philadelphia, Pa. He very soon gave up the drug business and took up photography as his life work. True to his name he became the world's most noted photographer. He began business at No. 706 Arch Street and later moved to 704 on the same street. In 1864 he moved to 712 Arch Street, where he remained in business until the time of his death, April 27, 1917. He also had a studio at 1700 North Broad Street.

Mr. Gutekunst had photographed more of the world's celebrated people than perhaps any man in this country. Among the personages who sat before his camera were Presidents of the United States, famous generals, ecclesiastics, actors and actresses, litterateurs and statesmen. He had received decorations from kings and emperors.

Among those whose portraits he made were the scientists, Lords Kelvin and Herschell, and Professors Tyndall and Leidy, Baron Takaki, Wu Ting Fang, Presidents Grant, Cleveland and McKinley, Generals Sherman, Meade, Longstreet, Beauregard, Hancock, Rosecrans and a full score more of the commanders on both sides in the Civil War; Admirals Read, Schley, Melville, Casey, McNair and Watson among the old seadogs who worried their country's enemies.

Clergymen who sat for him included Archbishops Bailey and Ryan, Bishops Phillips Brooks, Chatard, Foss, Davis, Fowler, Coleman, Kendrick, Hortsmann, McCabe, Potter, Simpson, Talbot, Whitaker, Walden, Bowman and a dozen more wearers of the purple of the church. Henry W. Longfellow, E. C. Stedman, Walt

Whitman, Bayard Taylor, Sir Edwin Arnold and Thomas Dunn English are among the poets in the Gutekunst gallery.

Edwin Booth and Edwin Forrest and Charlotte Cushman and the elder Salvini are stars in the histrionic constellation; Theodore Thomas and Damrosch, masters of music. Prince Louis of Savoy, Prince Ranjitsinhji and the Prince of Turin are among the representatives of royalty; Jay Cooke, Anthony J. Drexel, A. J. Cassatt and J. Pierpont Morgan, leaders in finance; Edwin A. Abbey and Benjamin Constant are among the artists in the collection.

Cardinals Gibbons, Satolli and Martinelli were among the princes of the Catholic Church whom he had photographed.

Besides many medals and honors awarded him at expositions, Mr. Gutekunst was the recipient of various testimonials in the way of gifts from rulers of nations and other eminent personages. Because of his famous panoramic picture of the Centennial Exposition, the Mikado of Japan sent him a pair of gold-lined bronze vases, King Victor Emmanuel of Italy a gold medal and Emperor Francis Joseph of Austria a decoration.

He also had in his collection autograph letters from many distinguished men, who wrote to congratulate him on his success in making their portraits One of his letters shows that the name of Gutekunst had been carried even into the semi-civilized wilds of Africa. It was from the son of a king of the Zulu tribe. When Mr. Gutekunst read that a full-blooded African prince had carried off the George William Curtis first prize for oratory at Columbia University, New York, the photographer sent his own portrait of Mr. Curtis to the prince, who wrote to Mr. Gutekunst: "I can see clearly that you wish to teach me a great lesson. You wish me to carry back to my bush home the memory and life of this great American, in order that his bold stand for truth and for the great principles of living, and his wonderful wisdom, which is so well reflected in his inspiring countenance, may quicken our dark lives and give us manners, wisdom and power."

A eulogistic letter from the late Dr. Horace Howard Furness, the great Shakespearean scholar, was among Mr. Gutekunst's most valued possessions.

General Sherman wrote that with the Gutekunst photograph of General Grant before him it was next best to again seeing him in the flesh. Oliver Wendell Holmes wrote that he considered the portrait of Professor Tyndall as lifelike as his own. Grace Green-

wood wrote to thank Mr. Gutekunst for keeping alive the features of Charlotte Cushman. Professor William Ramsey, of the University of London, wrote that the portrait of Lord Kelvin surpassed in fidelity the portrait that was painted by Orchardson.

It was Mr. Gutekunst's practice to go home to lunch daily and eight weeks before his decease he sustained a fall while descending the steps of his residence to return to his place of business, 712 Arch Street. His wife, who was Sarah Coxe, died ten years ago. He is survived by two unmarried daughters, who reside with him, and a sister, Miss Mary Gutekunst.

Samuel E. R. Hassinger.

Mr. Hassinger, one of the old-time modest and retiring druggists of Philadelphia, died suddenly on February 21, 1917. He was born in Halifax, Pa., September 17, 1845. He received his preliminary education in Pittsburgh and Oil City, in which two towns he also learned the drug business. He came to Philadelphia in September, 1868, receiving employment from Mr. John Connor, a prominent druggist of his day. As young Hassinger was ambitious to secure a higher education he matriculated at the Philadelphia College of Pharmacy, graduating in 1870. This was a famous class, as it contained the names of a number of men who afterwards obtained considerable distinction and met with unusual business success. Upon the death of Mr. Connor, he purchased the store at 23d and Fairmount Ave., and continued in active management until his demise. Mr. Hassinger was interested in pharmaceutical organizations and attended their meetings whenever his duties permitted. He was a life member of the Philadelphia College of Pharmacy, the American Pharmaceutical Association and the Pennsylvania Pharmaceutical Association. He is survived by his widow, daughter and son.

Henry Kraemer.

June 25, 1917.

CURRENT LITERATURE.

French Inspection of Nursery Plants.

David R. Lewis, St. Etienne, France, states that interest in the prevention and control of plant diseases and inspection by scientific officials under state authority is increasing in France. The number of horticultural establishments (nurseries) and vine growers who submitted to phytopathological inspections in 1916 were double those of 1914. The value of plants exported for these years to countries requiring certificates of inspection showed a corresponding increase even under the unusual conditions prevailing.

Nurserymen feel assured of the continued growth of these figures by the guaranty of the French government that buyers of other countries will be protected against dangerous parasites and diseases in plants imported from France.

The establishments submitting to control are divided into districts and expert service of inspection is furnished by entomologists and cryptogamists in charge of the director of the entomological station of Paris, the cost of the supervision being cared for by a small fee per annum for each nursery, and a charge made on plants exported. Efforts are now being made to greatly extend the service.

M. G. S.

Paper Pulp from Australian Lalang Grass.

According to the *Indian Trade Journal,* March 2, a well-known agricultural and technical chemist in Queensland has conducted very successful experiments in manufacturing paper pulp out of lalang grass, commonly known as blady grass, on account of its great blades which are 4 or 5 feet long. It resembles very closely the esparto of Spain and North Africa, and when dried before making it into pulp yields as high as 60 per cent. of first-class paper-making pulp.

The expert states that esparto is the best pulp known and the blady-grass product is within 10 per cent. of the same value. There are millions of tons of this grass growing in Queensland. Three crops a year can be cut from it. Experiments are also being carried on with Chinese barr (*Urena*) and Queensland hemp (*Sida Retusa*), which produce 30 per cent. of first-class paper pulp. Lantana, which is regarded as a great pest, makes an excellent wrapping paper. Screwpine or pandanus, which also grows prolifically, is likewise being experimented with.

M. G. S.

Improvement of Guayule, the Desert Rubber Plant.

Much of the interest in the desert rubber plant, *Parthenium argentatum,* has centered at the Desert Laboratory since the publication by the Institution of Professor F. E. Lloyd's book on this wild plant. The volume in question (Carnegie Inst. Wash. Pub. No. 139, viii + 213 pp., 46 pls., 20 figs.), "Guayule: A Rubber Plant of the Chihuahuan Desert," embodies the results of an organized attempt to bring under cultivation a hitherto feral desert plant, together with an extensive ecological study of the same under normal and cultural conditions. Careful consideration is given to the question of rate of growth and reproduction of the guayule in its native habitat, and a large body of pertinent data is given. The various conditions of climate, soil, vegetational environment, and parasitism affecting the plant are presented in this connection. The life-history, habit, and anatomical and histological structure of the wild and cultivated forms are minutely described and compared, in order to secure exact knowledge concerning the relation between growth and the rate of rubber secretion.

The wild shrubs are collected in great quantities in Mexico and the rubber, which grades much lower than Para, is extracted by such simple processes as to make it a very profitable operation. The task of developing methods of cultivation has now been successfully accomplished by Dr. W. B. MacCallum and in making a genetic analysis of the plant he has established the fact that it includes a large number of elementary species which do not readily interbreed.

The company under whose auspices the experiments in cultivation were carried out has purchased 7,000 acres near Tucson, and guayule is now being established on this land. This effort is notable in that it is a successful attempt to bring a wild plant under profitable cultivation, and that it is the only rubber-producing plant within the borders of the United States.

Barium-Free Salt.

Economical Method of Eliminating the Poison from Brine.

A method of removing barium from brine used in the manufacture of salt has been worked out by the Bureau of Chemistry of the U. S. Department of Agriculture. This method is now used successfully by one large commercial manufacturer, and it is believed will prove both profitable to other manufacturers and a safeguard to the consumer.

In a number of cases animals have been poisoned by salt made from the brines of the Ohio River valley in West Virginia and Ohio. This salt has been found to contain frequently considerable amounts of barium chlorid. The Bureau of Chemistry has fixed a maximum of 0.05 per cent. as a tentative standard for food salt. In practice, it has been found that what is known as No. 1 grade salt may contain from 0.02 to 0.23 per cent. of barium, and the barium chlorid content of No. 2 grade may vary from 1.02 to 10.75 per cent. The No. 2 grade is not ordinarily sold for table or dairy purposes, and in recent years it has been customary to label it "Not for food purposes," or "Do not feed to stock."

This naturally interferes with the demand for No. 2 salt and there is a great temptation for the manufacturer to dispose of it by substituting it for or mixing it with No. 1. No. 1 grade salt is the trade name for the product that first crystallizes out when the brine is evaporated in long, shallow tanks or grainers. After the impurities in the brine become too concentrated as a result of this process, the brine is run into other grainers and evaporation continued. The salt from the second grainers is called No. 2, or off-grade salt. There is no definite rule for determining when the production of No. 1 salt should cease and No. 2 begin, and there is, therefore, a temptation for the salt manufacturer to continue evaporation in the first grainers longer than the concentration of impurities in the brine warrants. The new method of getting rid of barium remedies this to a great extent by permitting a greater production of what can be truly called No. 1 grade salt. It also aids in the elimination from the market of salt that may be a dangerous product.

This method calls for the addition of a solution of salt cake (sodium sulphate), the acidity of which has been neutralized with a small amount of lime, to the brine in large settling tanks. Air is blown through in order to stir thoroughly the mixture and to decompose the bicarbonate of iron naturally present. This forms a flock and produces a rapid sedimentation of the insoluble barium sulphate formed. The cost of the treatment is estimated at about 1 cent per barrel of salt, which is more than offset by the increased value of the product. In one large salt factory this process has been in operation for over a year, and it has been found that only insignificant traces of barium remain in the No. 2 salt which is, therefore, a safe product for food purposes.

FACTORS AFFECTING THE YIELD AND QUALITY OF PEPPERMINT OIL.

The effect on the yield and quality of peppermint oil of cultural and climatic conditions is discussed in professional paper No. 454, by Frank Rabak, chemical biologist, Bureau of Plant Industry. This bulletin, recently published by the U. S. Department of Agriculture, is based on experiments in raising and distilling peppermint plants conducted from 1908 to 1912. Conditions of soil and climate, the author finds, are influential factors in the formation of oil and its constituents in the peppermint plant. Light sandy or loamy soil appeared to be most favorable for the production of an oil of high quality.

Distillation experiments were conducted with a view to determining the effect on oil yield of drying the plants previously to putting them in the stills. It was found that the yield of oil from fresh plants apparently decreases as the plant matures. Drying the plants before distillation results in a considerable loss of oil. The largest proportion of oil is found in the leaves and flowering tops. In experiments in distilling plants and parts of plants at different times of growth, the author found that the percentage of esters in the oil, which give the oil its fragrant minty odor, increases as the plants approach maturity. The menthol content of the oil bears a close relationship to the ester content. The free acidity and ester content of the oil distilled from dry plants is considerably higher than in the oil from fresh plants. The drying of the plants causes conditions favorable to making esters, while the percentage of free and total menthol in oil produced from dried plants is also uniformly high. It was found also that the formation of esters and menthol takes place most readily in the leaves and tops of the plants.

In another test it was found that the effect of shade upon the peppermint plant is to decrease the making of esters and the formation of menthol. Experiments with plants allowed to freeze indicate that frost noticeably increases esterification and the formation of menthol.